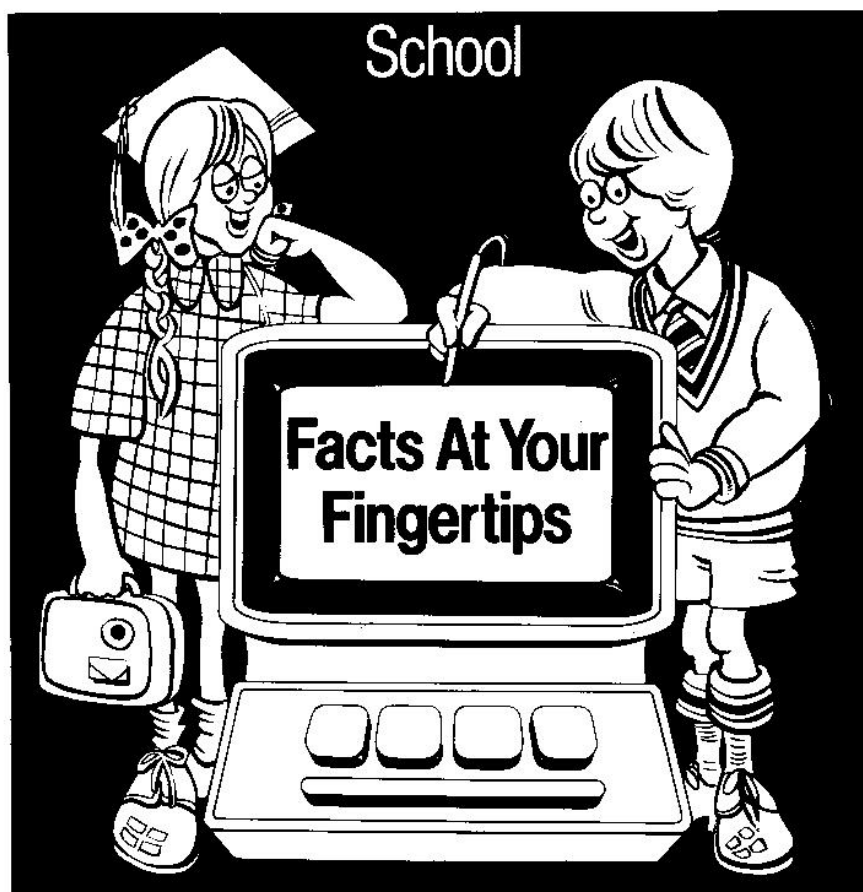




16th - 22nd August 1981

Information Technology Week

Information Technology Week is an annual event designed to focus the attention of the Australian community on computers and communication technology and their role in our future, so that by making information accessible we may be better prepared for change and future decisions. This pamphlet has been prepared by the Tasmanian ITW Committee to assist you to while away some unfilled moments with some exercises for your mind (or for younger readers — hands). We hope you find it interesting.



FOR CHILDREN — COLOURING COMPETITION

Colour in the picture above and send it with your name and address clearly written to P.O. Box 216, Sandy Bay, Tasmania 7005 by 31 August 1981. You may win the prize of a computer game. Entry is restricted to children aged up to 10 years. The judges' decision is final and no correspondence will be entered into.

Name Age

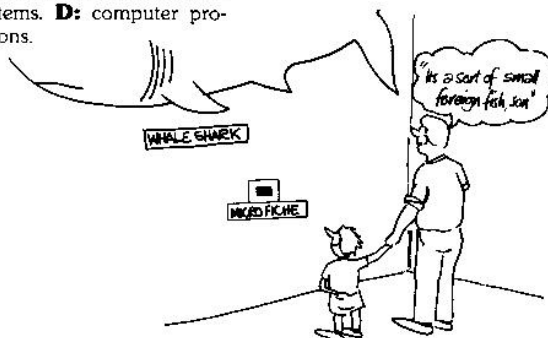
Address

Sponsored by: The Department of Science and Technology and the Australian Computer Society Inc.

Enrich your word-power

Although some of the following words or phrases have everyday meanings, they carry special meanings in connexion with computer or communication technology. To test your vocabulary, pick the phrase which best captures the meaning of the word or phrase. Answers are on the back page.

- telex** (tel'ek) — **A:** use of home TV set for enquiry purposes. **B:** system for do-it-yourself telegrams. **C:** cash dispensing machine in banks. **D:** dictionary of technological terms.
- floppy disk** — **A:** name given to computer system prone to failure. **B:** flexible circular sheet of plastic used for storing information. **C:** illness afflicting keyboard users with inadequate back support. **D:** rotating device for sorting mail.
- microfiche** (mik'rō fēsh; fish) — **A:** short gap between blocks of data sent along a telephone line. **B:** failure of electronics by minute fracture in wire. **C:** unit for measuring time (one millionth of a second). **D:** postcard-sized film bearing miniaturized printing.
- universal product code** — **A:** system of labelling goods for automatic identification. **B:** system for writing programs applicable in non English-speaking countries. **C:** system for storing information regarding quality of natural products (e.g. wool, timber). **D:** internationally agreed system for exchanging coded data.
- processor** (prō'cess or) — **A:** person who operates a computer system. **B:** person responsible for feeding punched cards to computer system. **C:** device for shredding confidential computer-printed material. **D:** part of a computer system that carries out instructions and arithmetic.
- videotex** (vid'ē ō tex) — **A:** method of recording information on magnetic tape. **B:** system using television sets to display information from central computer. **C:** fire alarm for data-processing installations. **D:** system used by Houston Space Centre to receive pictures from spacecraft.
- protocol** (prō'to kol) — **A:** procedure for starting computer system. **B:** experimental computer model. **C:** procedure for exchanging messages. **D:** priority order of computers in a system, e.g. master, subsidiary, minor.
- analyst** (an'a lyst) — **A:** computer program that records details of work processed. **B:** person who examines information flow and processing. **C:** person who repairs computer systems. **D:** computer program that detects malfunctions.
- integrated circuit** — **A:** computer component constructed from silicon. **B:** arrangement whereby one company supplies computers, programs, paper and all other requirements to a data processing system. **C:** direct connexion between two computers. **D:** system for routing information and documents in an office.
- robot** (rō'bōt) — **A:** device which mimics human speech. **B:** simulated human being capable of independent action. **C:** device which goes through a fixed sequence of actions. **D:** device capable of manipulating objects.
- bug** — **A:** device for detecting malfunction in a computer. **B:** person employed by company to detect computer-based fraud. **C:** common form of "chip" with six or more connecting pins. **D:** error in a computer program.
- encryption** (en krypt'shun) — **A:** translating information into a secret code to protect it. **B:** storing of data in a vault where it cannot be stolen or damaged. **C:** theft of computer information. **D:** gaining access to a computer system with a password.
- facsimile** (fāk'sim ily) — **A:** transmitting pictorial information. **B:** reproduction of factual information about a person. **C:** self-checking procedure used to test an information-processing system. **D:** printing of a document by a word-processor.
- continuous stationery** — **A:** scheme for carrying cash balance forward to next month. **B:** scheme for continuing accounts, etc., on more than one sheet of paper. **C:** paper forms which are joined at opposite edges forming a very long sheet. **D:** state of computer which is not functioning.
- computer bureau** — **A:** company offering computer access for hire. **B:** storage unit for storing magnetic tapes. **C:** company providing temporary computer staff for hire. **D:** company specializing in job-search for computer professionals.
- software** (soft'wear) — **A:** system for ensuring that a malfunctioning computer can still operate slowly. **B:** computer programs that are of general use. **C:** term applied to clothing and haberdashery merchandise. **D:** term applied to computer professional staff.





Mind-Teasers

The following puzzles vary from easy to moderately hard. However, they can all be solved by simply thinking about the problem; no calculators or reference books are needed. The skills of puzzle-solving are similar to those of a computer programmer trying to find out why a program doesn't work. Even bizarre ideas might be right!

Circuitous route

An exploration scientist clambered aboard his vehicle after dropping a marker on the ground. He intended to mark out a 10 km square which he would later examine carefully. Setting the automatic pilot to drive 10 km due south, he relaxed. On being told by the on-board navigation computer "Destination reached", he opened the door and tossed out another marker. Resetting the automatic pilot to travel due west, he repeated this, and then again for the 10 km due north leg. However, just before setting the pilot to return home he glanced out of the door and was horrified to see *two* markers right alongside each other. Puzzled, he entered the fact in his computer log, and was even more surprised to hear it reply "You also threw the previous marker on top of another one." Since the satellite navigation system of the automatic pilot was normally accurate to 10 metres, the scientist was inclined to think the computer had gone wrong, but after a few moments of thought he slapped his head and said "Of course..."

Where on Earth was he? And what had happened?

Misunderstanding

An ethologist was surreptitiously observing a young woman writing on a piece of paper. He observed her write down a number, and then apparently she wrote down half of it, and half of that, in a column until she reached one, ignoring any remainders. Then she started another column with a new number, and she appeared to write down double the new number into two columns, without any order apparent to the ethologist. Having done this she wrote down another number at the bottom of the right-hand column, looked at it frowning for a moment, put it into her bag and left.

Since the ethologist did not have the opportunity to ask her what she was doing, he presumed that he had witnessed an astrological ritual, or a biorhythmic calculation. The table, as he reproduced it in his book, went like this:

22	421	
11		842
5		1684
2	3368	
1		6736
		9262

What was she doing?

What about errors?

The Wombat Trading Company are introducing a new credit card system, and the General Manager is discussing it with Tania, the Data Processing Manager, and Fred, the Sales Manager. Fred is explaining that the new credit card number consists of nine digits — the first four being the holder's postcode, and the next four being chosen to identify one customer in that postcode.

"But," interrupted the General Manager, "what if these new-fangled numbers are entered into our accounts wrongly? We'll bill the wrong person, and that won't help customer relations."

"Aha!" said Fred, "that's where the ninth digit comes in. It is always chosen to be the remainder of dividing the 8-digit number preceding it by 11, except that if that gives 10 we simply don't use that number and pick another. Then if the staff make a mistake in any one digit the computer will detect it isn't correct when it checks the ninth digit. It will ask the operator to re-check the entry."

Worried, Tania stated "But I've found that the most common mistake is that of typing two adjacent digits in the wrong order! Such as entering 7001-9786-3 instead of 7001-9876-3."

Is Fred's assertion correct and will all single errors be detected? Will the checking scheme cope with Tania's problem?

Program?

An archaeologist of the 22nd century is digging in the ruins of the great city of Sydney, when he finds the following fragment of text:

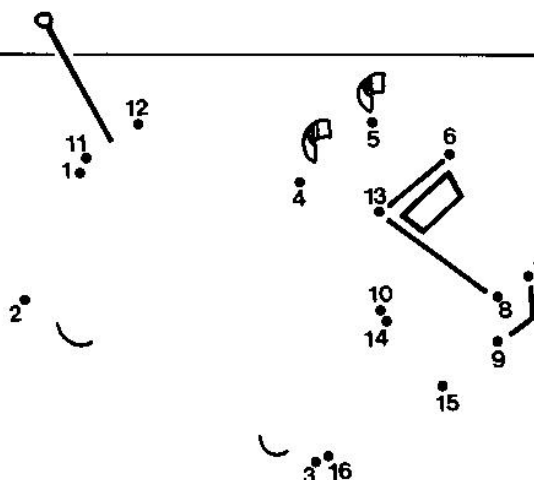
1 tr into 6th ch from h
*1 ch, miss next ch, 1 tr into
next ch, rep from * to end.
Turn. 32 sps. Cont

Highly excited, the find is reported to the Great Australian Museum at Bulahdelah, where the expert opinion is that the fragment must be part of a much larger computer program in some hitherto unknown and lost computing language.

Were you to travel forward in time, could you assist the Museum in establishing the identity of this computing language? And its use?

FOR CHILDREN

Join the dots, starting from 1, in order of numbering



Answers to

"Enrich your word-power"

- 1. telex** — B: system for do-it-yourself telegrams. Operators at telex machines send messages through a Telecom network similar to the telephone system. Word derived from proprietary brand name.
- 2. floppy disk** — B: flexible circular sheet of plastic used for storing information. So-called in contrast to earlier forms of "hard disk" using rigid aluminium sheets to hold the magnetic powder coating in which information is stored. Widely used in word-processors and small computers; can hold between 150,000–1,000,000 characters of text depending on size; and cost around \$3–\$10.
- 3. microfiche** — D: postcard-sized film bearing miniaturized printing; widely used for library catalogues, salesman's catalogues, and other bulky information. From 50–200 pages will fit on one microfiche.
- 4. universal product code** — A: system of labelling goods for automatic identification. Currently being introduced to Australia, this system is used overseas in warehouses and automated supermarket checkouts to reduce errors and provide more information on customer receipts. (The label consists of thick and thin bars in a small rectangle about 1 cm by 3 cm.)
- 5. processor** — D: part of a computer system that carries out instructions and arithmetic; hence microprocessor, small processor. Derived from process, used in the sense of processing information.
- 6. videotex** — B: system using television sets to display information from central computer. Derived from video (pertaining to TV) and text, there are several such systems in use in Europe and North America. Australia is likely to adopt one shortly, providing an enquiry service through the telephone network and television facilities.
- 7. protocol** — C: procedure for exchanging messages; usually by a series of exchanges certifying that sender and receiver are active and later have completed the transaction. Used mainly in connexion with communication along telephone and similar lines. Borrowed from diplomatic usage.
- 8. analyst** — B: person who examines information flow and processing; other responsibilities include recommending changes to existing procedures where warranted. Often qualified as *systems analyst* or *computer analyst*, this is one of the computer industry's main job classifications.
- 9. integrated circuit** — A: computer component constructed from silicon. The silicon "chip" is usually very small (say 5 mm square or less), and contains up to 100,000 component transistors. The name is derived from the fact that the wiring and the components are both integrated into the silicon crystal.
- 10. robot** — D: device capable of manipulating objects; thus *industrial robot*: device capable of undertaking assembly-line operations under computer control. Word coined by Capek in play *R.U.R.*; derived from Polish *robotnik* workman. Usage B (simulated human being) is purely science fiction.
- 11. bug** — D: error in a computer program. Thought to have been coined either in reference to squashed insect on programming form leading to error, or by defensive programmers seeking to attribute errors to external sources. Hence to *debug*: to attempt to remove errors from a program.
- 12. encryption** — A: translating information into a secret code to protect it. Similar in meaning to *encode*, but with connotations of security. Encryption techniques are increasingly used to protect information transmitted on public networks, or against theft.

- 13. facsimile** — A: transmitting pictorial information. Facsimile services reproduce a document at the far end of a communication system more or less as it looks at the transmitting end, thus handling signatures, line-drawings, etc. as well as printed or typed text. Often abbreviated to *fax*.
- 14. continuous stationery** — C: paper forms which are joined at opposite edges forming a very long sheet; manufactured in plain paper forms, invoices, cheques, forms bearing adhesive labels, and many other forms. Used for automatic feeding into computer printers.
- 15. computer bureau** — A: company offering computer access for hire; other services may be provided such as consultancy, but these are ancillary. Derived from analogy with employment bureau, etc.
- 16. software** — B: computer programs that are of general use. Partly derived from the fact that the only tangible aspect of programs is their printed form, and partly from a contrast with *hardware*: the actual computer equipment. Recent jargon has also introduced other essential components of a computing installation as *firmware* (in between soft- and hardware) and *liveware* (ugh! the personnel).

Vocabulary ratings

- 16 – 14 correct exceptional
13 – 11 correct excellent
10 – 8 correct good

Answers to Mind-Teasers

Circuitous Route. The scientist is near the South Pole; in fact near enough that when he travelled west after going 10 km south, the navigation computer took his instructions literally and drove in a 10 km circle around the pole, ending up where he had thrown the second marker. The third marker was thrown out and the vehicle retraced its steps north right back to where he had started! In numbers, he was $10 \text{ km} + (10 \text{ km}/2\pi) = 11.59 \text{ km}$ from the South Pole. (If you thought he was at the North Pole, you ignored the computer's extra information. Give yourself half marks.) (7 points)

Misunderstanding. She was doing a multiplication, and was about to buy 22 identical presents for her remote relatives at \$4.21 each. The multiplication technique used is not taught in Australian schools, but it is quite quick and simple, and has been used as an alternative to our method in other cultures. (20 points)

What about errors? Fred is correct. Making an error in the fifth digit (say) is equivalent to adding 1000 to the 8-digit number, and since no number ending in 0 is divisible by 11, the computer will deduce a different remainder from the check digit actually present. Similarly, it copes with Tanya's problem, because the effect of transposition is again equivalent to adding or subtracting a number which can't be exactly divided by 11. This scheme of check numbers is known as *modulus-11* and is widely used to reduce clerical errors. (20 points)

Program? As many people will immediately recognise, the fragment is in a computing language which describes the process of making garments using the technique of crochet. Crochet language does not have a name, but it is none the less a formal description and a computing language. (10 points)

Mind-teaser ratings

Give yourself full points if you got most or all of the answer; half points if you got some of it.

- 60 – 40 exceptional (Do you like puzzles?)
39 – 30 excellent (You should be in the computing industry.)
29 – 20 good (Frustrating to be stumped, isn't it?)
19 – 10 satisfactory (Did you give yourself enough time?)
9 – 0 — (Not your cup of tea.)